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ABSTRACT

Presenting information from school projects, interviews, workshops, conference sessions, newsletters, conference review reports, and technological developments, this series of four project information updates reports on a variety of issues relating to student achievement. The first update reports some recent work in facilitating student achievement in reading, writing, thinking, using technology, and school, parent, student, and community partnerships. The second update describes six programs representing a sample of programs that have changed to improve student achievement in reading. The third update interviews five people regarding their experiences with issues surrounding technology in the schools. The fourth update (the last in the series) focuses on two staff development efforts designed to help teacher educators and staff developers use cutting-edge research and practice-based information about instructional approaches that improve student achievement. In addition, an inservice workshop on thinking skills, and four staff development workshops on classroom assessment are also discussed. (RS)

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AHEAD OF THE CURVE

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Number 1

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AHEAD OF THE CURVE

Number 1

Overview

A central goal of educational improvement is to increase student achievement. It is the underlying reason around which restructuring, accountability, and teacher performance revolve. The information pool on student achievement is growing rapidly with new conferences, newsletters, books, research, and legislation addressing this topic being produced. The purpose of this update is to report some of the recent work in facilitating student achievement in reading, writing, thinking, with partnerships and technology. Information comes from conference sessions, newsletters, conference review reports, and technological developments.

Reading

The annual Computers & Reading/Learning Difficulties Conference is attended by teachers from a variety of content areas, but primarily those in reading, English, English as a second language, Chapter 1, adult basic education, handicapped or special needs students, or learning disabled students. A West Coast conference in San Francisco in January and an East Coast conference in Phila-

delphia in April each include a large exhibitors area, exemplary programs, preconference workshops, and regular sessions that focus on classroom applications of the latest technology. More than 120 sessions, workshops, and special events, all have a practical classroom focus. Computers, telecommunications, and electronic media are used to address reading and learning difficulties. The exhibit area includes computers that provide hands-on experimentation with software.

The conference has strands in administration, adult literacy, ESL, evolving technology, learning disabilities, reading, special education, and writing. Pre-conference workshops, running from half day to whole day sessions, included sessions on grant writing, cooperative learning, spoken and written language, reading comprehension, adventure simulations, Hypercard, desktop publishing, the whole language approach to literacy, AppleWorks spreadsheet and database, Microsoft Works, teaching writing, language arts technology, administrative uses of technology, telecommunications, and computer maintenance. These pre-conference sessions were among the most informative of all the presentations.

Two representative sessions, a preconference workshop and the other a regular conference session, are reviewed in this section.

HyperCard preconference workshop

Presenter: Janet Graeber
Computer Coordinator,
Schools of Sacred Heart
San Francisco, CA

This Apple software is a powerful and easy-to-use program that can be used to link many different media—computers, sound, compact disc players, graphics, animations, databases, and word processing for classroom use.

HyperCard allows students or teachers to create

AHEAD OF THE CURVE is a series of updates produced by the Southwest Educational Development Laboratory (SEDL) as part of its programmatic theme on Facilitating student achievement in reading, writing, thinking with partnerships and technology. It provides information for practitioners and experts. Send information, suggestions, and comments to Dr. Ida Jean Holman, SEDL, 211 East 7th Street, Austin, TX 78701.

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stacks based on the curriculum and its objectives. Such stacks put the student in immediate touch with information, visuals, maps, animations, and sounds to explore the curriculum. The presenter indicated that students as young as fourth grade are setting up HyperCard stacks.

The most interesting aspect of this software is its organizational structure. Unlike much computer software, which can only be organized in a linear, sequential fashion, HyperCard can be organized in a linear fashion, a tree structure (what most people think of as branching), a cobweb structure (what most people think of as associational thinking), or any combination of the above. Students can easily program navigational buttons that will move them through various stacks to a location that is above, below, beside, or in any direction. Icons used in HyperCard, as in all Macintosh applications, are simple to understand and use.

There are also HyperCard stacks which have already been developed. A good catalogue with educational applications of HyperCard are available from BMUG, 1442A Walnut St. #62, Berkeley, CA 94709 (415-549-BMUG).

One teacher-developed HyperCard stack, exhibited in this session, concerned a unit on zoo animals for elementary students. Students fill in fields with descriptive information for each zoo animal, forming an informational database of each animal's essential characteristics—food, habitat, etc. Pictures of each animal and parts of the animal also form some of the cards. Students can click on a given part of the animal, such as the lion's claw, and open up a card which demonstrates its action through animation. They might click on the lion's mouth and hear the lion roar.

By linking the cards together, students might pull up all the ones that associate animals through similar habitat, families of animals, or any other sorting device. Students can draw their own pictures and add them to the stacks. Combinations of information and integration of media require external devices, such as a compact disc player or a special device for generating digital sounds, but the variations of ways in which information can be presented and manipulated are seemingly endless.

The main disadvantage of this software is that the

amount of computing power required demands that schools purchase specific models of Macintosh computers and specific external devices that are compatible with the Macintosh. Some schools, however, are finding the investment worth their while, especially when outside funding is available. For example, in British Columbia, the government of Canada is providing funding for teacher-developed software including HyperCard stacks.

Telecommunications as a Motivator for Reading and Writing Skills

Presenter: Holly M. Jobe
Coordinator, Technology Services
Montgomery County Intermediate Unit
Montgomery Avenue and Paper Mill Road
Erdenheim, PA 19118

This presentation outlined the classroom use of telecommunications, particularly bulletin board services and electronic mail. The speaker, who represents an intermediate agency that works with teachers in the Philadelphia area, outlined some of the available online services, including The Source, CompuServe, the DOW/JONES Electronic Information Services, and FrEdMail, a free, 24-hour-a-day nationwide grassroots network of local bulletin board systems for educators. (Contact Holly Jobe for more information about FrEdMail.)

Educators are finding uses for telecommunications for students, teachers, and administrators. Students can communicate with pen pals, work on collective projects, access remote data bases, interview people in remote places as primary sources, and locate new resources. Teachers can contact their regional offices, network with colleagues, use on-line resources, and function within their curriculum. Administrators are able to gather information, contact regional offices, and network with colleagues.

The Montgomery Country Intermediate unit uses telecommunications in an unusual instructional program fashioned after the AP wire service. Two school districts, one in Pennsylvania and one in Denmark, have set up a link between two eighth grade classrooms. Students send information about themselves, their school, and the lifestyles and activities of Americans and Danes to one another via telecommunications. Each school then

creates a newspaper, using computers to develop and lay out text and pictures. Teachers report that the project's impact on classrooms is considerable. The motivation is very high, and students don't want their words sent abroad unless they are letter-perfect.

Writing

[Note: This reviewer of Harcourt Brace Jovanovich's WRITER software is a computer user, but by no means a programmer or particularly expert. So these remarks may serve as a reference for inexperienced teachers previewing composition software.]

Software for computer-assisted teaching of composition is currently moving away from instructional software to writing support packages, word processing programs, and networking software. There also are a few comprehensive packages that support students' writing activity through the prewriting, planning, writing, and rewriting stages of the process.

One such software package is Harcourt Brace Jovanovich's WRITER, published in 1986. Designed for college-level beginning composition classes, this software is applicable for writing across the curriculum in secondary school as well. It requires an IBM Personal Computer with 256K of memory, a monochrome monitor, two double-sided disk drives, and a parallel printer. The software includes prewriting aids, word processing, and reviewing/revising aids. It is a unified approach to writing that is more integrated than much of the other commercially available composition software. Some of the other software in the package serves admirably in the areas of formal heuristics, (orderly procedures for discovery), collaborative networking, style analysis, proof-reading, revising, or grading and commenting on writing.

WRITER contains four prewriting aids: freewriting, invisible writing, nutshelling, and planning. Of the four, invisible writing is the strangest to use. Students type into the computer in response to a writing prompt, but they do not see their words until after they have completed their writing. The purpose is to encourage students to write without inhibitions about usage,

punctuation, or grammar until they have gotten words down on paper. The idea is admirable, but many students will find this format frustrating.

Nutshelling, another prewriting aid, provides a very good strategy to help students clarify their ideas, decide on audience, and specify the desired audience response. Students answer questions concerning the title, purpose, audience, and central ideas of their essay. WRITER not only uses nutshelling as a prewriting aid but also as a reviewing/revising exercise. Writers can produce a nutshell of their work after completing it and then can compare it with the prewriting nutshell. As an alternative, teachers or peers can fill out a nutshell on a student's written work and compare their nutshell with the student's intended purpose, audience, etc. as manifested in the actual composition.

The word processing part of this package is probably its weakest component. A large paper template, which fits around the whole IBM keyboard, assigns functions to each key. The designers, however, made unusual keyboard choices. For example, instead of using the cursor arrow pad, the student uses four function keys, a highly unnatural configuration. Other problems with the program's word processing involve the need to return from the work at hand to the "Back from Editing" screen, in which the student *must* make the choice of saving, renaming, or throwing away the text file. Although this step probably avoids losing work in progress, it is an unwieldy process. Deleting is equally unwieldy. To delete a word, line, sentence, or paragraph the student uses the Alt key, which functions as "erase," in conjunction with another key, such as the cursor key. The delete key is not used in its normal fashion. Since there are so many good word processing programs available, WRITER's seems to be labored and unfriendly, especially for students experienced in using word processing.

The reviewing/revising aids do offer some useful features. The ability to split the screen in order to compare the original with a revised version, to work on two different papers, or to look at a composition while examining its organizational structure is extremely helpful. The split screen also allows students to imitate passages provided by the teacher, to expound upon definitions of words within a given composition, or to manipu-

late in their own way a sample provided by the teacher or classmates.

Reviewing/revising includes aids on organization, style, mechanics, and commenting on a paper. The latter is particularly useful because it provides students with a helpful on-line guide of questions to be answered and because there is space for positioning extended comments within the composition that allows the student to respond through revision. Such commenting allows a real audience, which might include the teacher and other students, all of whose comments can be put on one print-out for comparative purposes. This software easily facilitates using a kind of communal bulletin board, where students periodically read and respond to one another's work. The current research on writing and peer response groups suggests that real audiences and frequent response to one another's writing increases students' ability to edit their own work.

WRITER's reviewing/revising aids also provide the computational ability to highlight and count significant words or phrases such as abstractions, passive verbs, gender-specific language, transitional words, pronouns, mechanical problems, and unusual word usage. The software compares words and phrases with its own rather extensive pre-programmed list, but it does not actually understand the context of the words. For example, whether "you're" or "your" is appropriate can only be determined by the student. Thus, the Style and Mechanics aids provide a helpful "flag" to direct the student's attention to potentially weak, incorrect, inadequate, or misused words or constructions. However, their use depends on the student's ability to interpret and apply meaning to the computer's suggestions. Without guidance from a teacher, the student might not know what to do with the computer's information. Reviewing and revising does, however, call attention to such problems as overemphasis on passive, prepositions, abstractions, and gender-specific language, all potentially troublesome practices into which many students lapse. An organizational feature assists students through outlining, nutshelling, and recognizing pronouns and transitional words.

The Instructor's Manual offers a good overview of the instructional potential of the software. Use of this package by teachers other than in English

might assist schools in their efforts to encourage writing across the curriculum. Like much composition software, WRITER ultimately is only as good as the teacher's ability to incorporate it into instructional goals. Its usefulness is primarily in its flexibility and its inclusive span of the whole writing process which is lacking in other software. As long as teachers pay attention to the WRITER logo and distinguish it clearly from the specific WRITER disk which has the word processing portion of the software on it, there should be few mechanical problems (unlike those some of us had!)

Thinking

In recent years, education conferences, publications, and programs have focused on critical thinking. Newsletters, conference papers, articles, and books on the topic are appearing at an accelerated rate. The following is a review of four recent publications about thinking:

An Annotated Bibliography on Thinking Skills in the Language Arts has recently been completed as part of a cross laboratory collaborative effort by the Regional Laboratory for Educational Improvement of the Northeast and Islands in Andover, Massachusetts. The bibliography contains 28 entries that were selected using the following criteria:

- Relevant to the deliberate teaching of thinking through the language arts.
- Balanced with theory and practical strategies for implementation.
- Appropriate for educators of varied grade levels, i.e. elementary school through college.

Although the teaching of reading for comprehension and writing for synthesis have always involved thinking, the emphasis of these resources is on the more deliberate teaching of thinking through reading, writing and speaking. The intent of the bibliography is to provide teachers and administrators with current information from a variety of sources in order to extend student thinking through language arts instruction. Copies are available from The Regional Laboratory for Educational Improvement of the Northeast and

Islands, 290 S. Main St., Andover, MA. 01810.

Critical Thinking: Theory, Research, Practice and Possibilities, recently released by the Association for the Study of Higher Education (ASHE) and ERIC, the Clearinghouse on Higher Education at George Washington University in Washington, D.C., surveys theory, research, teaching practice and institutional programs.

Based on the assumption that a thinking style is generally the result of three factors: (1) national inclination towards a particular style, (2) modeling, and (3) the formal educational process (Kurfiss, 1988), the report focuses on the educational process. It begins with an in-depth overview of the three perspectives that dominate current literature on critical thinking and its development in college: argument skills, cognitive processes, and intellectual development.

The report addresses the question of how educators can foster critical thinking, then describes numerous examples of programs and courses that successfully integrate critical thinking with content learning in many disciplines. Some of these strive to overcome students' reluctance to tackle difficult assignments by connecting themes, values, and modes of inquiry within a discipline with experiences and questions that are meaningful to the students. The report also identifies some of the procedures used at the institutional level to secure participation and support of faculty in every discipline. Upon successful implementation of the courses or programs, administrators reported an increase of faculty vitality, renewal, and collegiality.

The last section contains recommendations to strengthen critical thinking including support for research, practice, and dissemination of critical thinking pedagogy from a variety of sources. Although the report primarily deals with college-level practices, the principles can be applied to all levels.

Inquiry: Critical Thinking Across the Disciplines is a newsletter produced by the Institute for Critical Thinking at Monclair State College in Upper Montclair, New Jersey. Beginning in February 1989, *Inquiry* began publishing articles and letters, some of which are quite controversial, from colleagues at institutions of higher learning other than

MSC. Some of the articles and letters are quite controversial in an attempt to challenge readers to respond. The newsletter also cites lists of resource publications that are too long to be included in the newsletter, but are available on written request from the Institute.

Teaching Thinking and Problem Solving, a bi-monthly publication devoted to theory, research and practice related to thinking skills, is designed to facilitate the sharing of ideas and current information in the area of thinking. It is a collaborative effort between Research for Better Schools, 444 North Third Street, Philadelphia, PA. 19123 and Lawrence Erlbaum Associates, Inc. of Hillsdale, New Jersey. *Teaching Thinking and Problem Solving* includes short feature articles, book reviews, program descriptions, conference information, preprint publication information, announcements, and a calendar of upcoming events.

Partnerships

As the reality of the dropout problem becomes inescapable, more schools, school districts and communities will begin to address the problem. Although no "ready-made" answers exist, one common denominator among successful prevention programs seems to be some form of partnership among schools, parents, students, and communities.

These partnerships can take many forms, such as the creation of a community school that resembles one in East Los Angeles. At this school the principal created a sewing room with borrowed and donated sewing machines. Parents were invited to make outfits for the band and curtains for the classrooms. In return for their help the parents were allowed to use the machines to make clothes for their own children. As a result, a community within the school was created in which parents felt that their contributions were valued and the principal always had parents for assistance. Apparently the program has had a positive effect in the classroom too, as students' reading scores have risen dramatically. This is only one of the many forms a community school may take, for, by definition, it should reflect its surrounding neighborhoods.

Another type of anti-dropout partnership in Baltimore, Maryland has created a business-school partnership among the Greater Baltimore Committee, the Baltimore Public School System, and Baltimoreans United in Leadership Development (BUILD). Here high school students who maintain a 95% attendance rate and passing grades are rewarded with post-graduation job interviews and/or college assistance.

Providence, Rhode Island is another community that is addressing this problem with a partnership. Aware of a dropout rate that hovered between 45 and 50 percent, the Superintendent of the Providence Schools invited various sectors of the community to join the fight. Their initial step was to determine the reasons why students drop out. Research indicated that at-risk students often face complex, interwoven problems, only one of which is generally addressed by the school. As a result, Providence needed to offer coordinated, comprehensive services to address the problems a student faces in six specific areas: academic performance; family life; self-esteem; employment and career guidance; pregnancy, parenting, as well as sexuality information; and recreation.

The community began implementing a program in the spring of 1988 with the goal of increasing the percentage of students who graduate from Providence public schools. This collaborative community-school partnership illustrates an effort to combat a common problem and its effort's two phase plan to address their dropout problem is as follows: (1) bring together school staffs and community agencies to provide students with the additional support needed and (2) increase public awareness of the seriousness of this problem.

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- The Providence Dropout Prevention Plan: Strategies and Programs for At-Risk Students. Executive Summary.* (1988).

Technology

While the use of computers in education has not yet lived up to its potential for improving American education, it has "...already contributed to important improvements in learning" and has had some impressive results according to The United States Congressional Office of Technology Assessment(OTA) in *Power On! New Tools for Teaching and Learning* (1988).

Power On! examines the current educational uses of computer-based technologies, analyzes key trends in hardware and software development, evaluates the capability of technology to improve learning, and explores ways to substantially increase student access to technology. Recommendations include increased federal funding to spur research and development of educational applications and improved teacher training.

One of the difficulties in evaluating the impact of technology on education is that there are many different applications, each of which serves a different purpose well. Among the effective educational uses of computer technology are:

- drill and practice of basic skills
- word processing programs to teach writing
- simulations, games, and data-bases to provide "self-contained worlds" in which students can experiment and see results quickly
- computer literacy for general purposes
- communications tools for students who cannot otherwise write or speak
- academic courses and staff development programs to schools in remote and resource bound locations
- tools for individualized learning and cooperative learning
- machines for management of classroom activities and record keeping.

The OTA concludes that Congress needs to consider a substantial federal investment in research

and development of interactive technologies for education. Promising developments that could use such seeding are:

- intelligent tutoring systems
- computer-managed multi-media environments including video, graphic, and audio representations
- interactive simulations, "microworlds" (i.e. *Logo*), and exploratory laboratory experiences that enable students to explore, manipulate, and discover
- "intelligence extenders" or integrative tools (i.e., *HyperCard*) that allow students to link information
- assessment measures that track learning, diagnose conceptual understandings, and evaluate the attainment of nontrivial skills
- design tools, authoring systems, and knowledge kits that enable teachers to develop their own teaching materials, modify curriculum, and develop individualized lessons
- new curriculum based on the skills students need in the information age, shifting in emphasis from what to learn to how to learn

One example of the impact of federally supported work is the collaborative efforts of the Educational Technology Center (ETC) in science, mathematics, and computing education. Based at the Harvard Graduate School of Education, ETC was established by the U.S. Department of Education in 1983. Since the beginning, ETC has focused on concepts that are both crucial to student progress and widely recognized as difficult to teach and learn.

The 15 collaborative ETC research groups, including scientists and mathematicians, practicing teachers, learning theorists, and software designers, study the nature of students' difficulties to develop ways to **teach for understanding** (defined as an enlarged concept of basic education that includes deep exploration of key ideas, an improved ability to identify and solve problems, and an overall grasp of the nature of science and

mathematics). (*Making Sense of the Future*, 1988).

ETC's instructional program development has utilized the computer's unique capability to provide interactive learning environments and present dynamic visual representations that help students construct their own mental models of difficult concepts and phenomena. Their work has focused on "targets of difficulty," or topics that are both central to the curriculum and widely recognized as difficult to learn. Research reveals that students bring to the classroom both considerable knowledge and resilient misconceptions about scientific and mathematical phenomena. Thus, ETC starts instruction with the students' existing notions. By analyzing both the subject matter and students' ideas about it, the ETC groups have designed methods of teaching for understanding and then determined when and how to use technology. In this way they hope to ensure that these programs will be applicable to classroom practice.

ETC celebrated its five-year anniversary with a conference on the role of new technologies in improving science and mathematics instruction in the schools. The conference features ways that the computer promotes learning for understanding, which include:

- *The Second Voyage of the Mimi*, a video-based instructional unit on archeology using a theory of learning that stresses the role of **story** — with character, context, and a plot line that engage student interest.
- *Palenque*, an interactive optical disc application based on a discovery learning approach, designed to allow students to explore the Mayan archeology site presented in the *Voyage*.
- *Immigrant*, integrated software for social science classes offering a simulated experience of an Irish immigrant family in the mid-1800's. The simulation includes word processors, databases, and spreadsheets.
- *Stella*, a software package that allows students to build and use computer models of topics in physical science, physics, biology, chemistry, and history. This package is designed to foster systems thinking and modeling.

- *Elastic*, software designed for the *Reasoning Under Uncertainty* curriculum, which teaches statistical reasoning to high school students. *Elastic* is a tool for recording, representing, and manipulating statistical information. It contains three interactive programs—Stretchy Histograms, Sampler, and Shifty Lines—that allow students to explore the properties of statistical representations by manipulating data sets on the computer.
- *Geometric Supposer*, software for geometry which provides a guided inquiry environment for students to explore the mathematics of shapes. *Supposer* allows students to model and explore the principles of geometry.
- *The National Geographic Society's Kids Network*, a science curriculum which uses telecommunications to link elementary school students across the nation in the study of real-world

scientific observations— for example, wind patterns.

For a complete listing of ETC products write:
Educational Technology Center
337 Gutman Library
Harvard Graduate School of Education
Cambridge, MA. 02138

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INTRODUCTION

The six programs featured in this issue are a sample of programs from the SEDL region that have changed in order to improve student achievement in one, some, or all of the five Theme E strands: reading, writing, thinking, partnerships, and technology. The featured program may be the addition of a special course to the existing curriculum, an enrichment program offered statewide, or a different approach to teaching that may change the entire emphasis within the school. Each of these programs has been identified by Theme E as implementing promising practices.

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Reading



Writing



Thinking



Partnerships



Technology

School-Within-A-School

Springdale High School

1103 W. Emma Ave.

Springdale, Arkansas 72764

Mr. Harry Wilson, Principal

In a homogeneous, rural community in northwestern Arkansas, Springdale High School boasts fewer social problems but fewer opportunities than more urban areas. In 1986-87, Springdale began its School-Within-A-School (SWS), based on the ideas of the Coalition of Essential Schools (CES) begun by Ted Sizer. SWS serves 60-80 students from grades 10-12 who are heterogeneously grouped. All students, except the severely learning disabled, are eligible upon application. This is not an "alternative school," but one which hopes to include a larger percentage of the entire school. The local school district funds the program, along with a three-year grant from the Rockefeller Foundation for teacher training. Costs run a little higher than traditional schooling because of reduced class size (no more than 80 students per teacher) and the need for one extra period per day during which teachers plan together.

SWS is an interdisciplinary course of study that offers four courses: Literature and the Fine Arts; Science; Inquiry and Expression; and Social Studies. Teachers volunteer for the program and hold multiple content-area certifications. Teachers choose a theme for each semester, such as "People: Conflict and Character," which is explored in the four major subject areas. Teachers plan together daily. Students spend four of their seven class periods in two-hour time blocks, although the length of a class period will vary de-



pending upon how much time is needed. The rest of the day is spent in electives and in math, which is a course in some of the CES schools. At Springdale High, however, it is treated as part of the regular curriculum because this faculty believes math is too sequential for SWS' interdisciplinary approach. Students are frequently regrouped, depending on specific work, but the grouping is always heterogeneous and multi-grade level. Teachers know the students as individuals. In terms of content, approach to teaching, and the structure of the classroom experience, SWS bears a strong resemblance to the self-contained elementary school classroom.



The program's major goals are to create a structure which allows senior high students to view all knowledge as related and to engage them as active participants in the learning process. The aims of this project, based on CES principles, are as follows:

- The school should help students learn to use their minds well.
- Curriculum should be guided by the goal of thorough student mastery, as well as achievement, rather than merely "covering content." Curriculum is shaped by students' intellectual, imaginative powers, and competencies, rather than by conventionally defined "subjects."
- Teaching and learning should be personalized as much as possible.
- Teachers should serve as "coaches" and students as "workers," an approach that is intended to provoke students to learn how to learn, and, thus, to teach themselves. Hence, the student's individual goals, not the teacher's goals, are the principal focus.
- Students and teachers should understand that all subject matter and knowledge provide opportunities for instruction in thinking, problem solving, and transfer.

A visit to some SWS classrooms and interviews with the teachers yielded many insights into this program: students are happy with the program because it allows them to work with one another, to process ideas, and to move around in the classroom. Teachers acknowledge that preparation time is greater, but immediately add that classroom time is more productive and hence, more satisfying. Neither teacher interviewed objected to the amount of work. Both teachers commented that the hardest thing about the program is to get students to realize that they actually do have ideas and their ideas are worthwhile. No one had ever required most of these students to think, and the students need to believe that someone wants to listen to their ideas. The science teacher has constructed his own lab worksheets that integrate use of the textbook for information; that provide a guide for the goals, resources, and procedures of the experiments; and that offer questions to probe the students' conclusions. The textbook's recipe approach for walking students through every step of the experiment is absent; students must THINK their way through the experiments.

Indicators of Change

- Formal evaluation process began in 1988-89 on seniors, who have been in the program for three years.
- Few students have dropped out of the program.
- There is almost no absenteeism.
- There are almost no disciplinary problems.
- Four teachers who volunteered to develop the program were still teaching enthusiastically in it in Spring 1989.
- The program seems particularly successful with undermotivated, at-risk, bright students.
- Teachers, students, and parents praise students' willingness to learn, awareness of related

topics and issues, and receptivity to new experiences, including classical music.

- One student who had repeated tenth grade three times and was a potential drop-out stayed in school and became a successful part of the SWS student body.

Telelearning—A Louisiana School Outreach Project, Louisiana School for Math, Science & the Arts

715 College Ave.

Natchitoches, LA 71457

Mrs. Martha Kay Talbert, Co-Director

Since 1985, Louisiana School's Telelearning Project has provided advanced academic courses via an interactive computer and telephone system to students enrolled at other rural, resource-bound schools throughout the state. They offer the following accelerated courses: Trigonometry/Pre-Calculus, Calculus, Comparative Government, French 2, and Survey of the Arts. This project received state-wide attention when Governor Buddy Roemer went on-line in Spring 1989 with a Calculus class, signing his name on an electronic pen-pad, which students then down-loaded.



Although there is a large demand for such courses, students at the rural schools must demonstrate academic readiness to participate in the network. Available equipment, not need, limits the number of participating schools in 1988-89 to 13. Class size per course (not per school) deliberately is limited to 20 students to assist in delivery of quality instruction.

Students communicate with one another and the teacher by phone and by an IBM-compatible computer. Instructional information is displayed on the computer screen; the teacher is not seen. Phones are used for inter-class communication, for transmission of music, and for other instructional information. Telelearning teachers' instruction

focuses on the content and the process of the class; the technology serves as a tool for delivery of instruction and not as the focus of instruction. The fact that students chat unself-consciously when the teacher goes off-line for a minute is testimony to the successful way the medium has become transparent for them.

Based on sound educational principles regarding class size, student interaction, and teacher availability for questions, this distance learning system makes use of commonly available, reasonably priced technology. Telelearning's funds come jointly from the Louisiana School and the Board of Elementary & Secondary Education (BESE), the Louisiana state school board. The law establishing the Louisiana School stipulated that the school, while located in Natchitoches, should serve the whole state. Each local school provides a proctor for the class and a local phone line. Each school site requires one 640K IBM-compatible computer, a pen-pad, a modem, OPTEL software, and a microphone. All are paid for and provided by the Louisiana School and BESE. The funding includes the use of a Darome audio-bridge to transmit courses. The Louisiana School plans to develop its own audio-bridge in order to reduce the cost of the program.

Telelearning teachers plan their lessons in advance in order to program their displays on disk. During the summer prior to the school year, the computers are reconfigured to accommodate a particular teacher's planned lessons. Each lesson, composed of 10-20 individual screens, is loaded prior to delivery of the equipment.

Although this is a high-tech method of delivery, it is not impersonal. Participating students visit the Louisiana School during the early fall semester to get to know each other, their teachers, and the equipment. Students' pictures are prominently displayed at the broadcasting teacher's terminal. Provisions are made to allow private student/teacher conferences via telephone immediately after class.

Indicators of Change

- The program is growing rapidly with three times as many applications as available equipment.
- Former Telelearning students now attending college report their Telelearning courses effectively prepared them for college-level work.
- Students have requested an increase from three times to five times per week of on-line classes.
- Students display sophisticated computer literacy, including developing short-cuts.

Chuska School, Bureau of Indian Affairs School

P.O. Box 321

Tohatchi, New Mexico 87325

Dr. Helen Zongolowicz, Principal

Wishing to improve the quality of the school and the educational opportunities for the students, the new administration at Chuska School in 1982 initiated a whole language approach; increased staff development; and increased staff, parent, and student involvement in all aspects of the educational process. The process has been slow and difficult, but changes have come.

This school combines boarding and day operations for students in kindergarten through eighth grade. There are 390 boarding students and 210 day students. Built in 1965 on the Navajo reservation, Chuska serves Navajo children, who are for the most part from economically deprived homes. It is 26 miles north of Gallup, New Mexico in the foothills of the Chuska Mountains.

The curriculum is designed to provide a quality education for all students in kindergarten through eighth grade. Students exiting should have developed strategies in the areas of reading, writing,

mathematics, and the social sciences. Higher level thinking strategies are emphasized in a hands-on approach to science and the practical arts. The programs are reinforced by all staff in the dormitory, recreation, and academic components for a total educational program.



This approach stresses the positive attitude that all children can learn and focuses on catching students being good. Seven practices are implemented as part of the whole language approach:

1. Adults read to students to expose them to an adult model of reading behaviors and to introduce them to more sophisticated writing and vocabulary than they can read on their own.
2. Students read silently to themselves daily from reading materials they select.
3. Students write every day, beginning with the first day of school, even though they may be the only ones who can read their own writing.
4. Students use familiar language they bring to the classroom as a basis for language activities. Games in the dormitory are used to increase the students' English language base.
5. Students talk about their experiences, write about them, and edit their stories.
6. The students and teachers discuss poems, stories, and books in extended literature activities.
7. Students are taught a reading strategy in which they learn to sample from print, make predictions, and read to confirm the predictions.

To augment the program, computers have been introduced into each classroom and are actively used in the writing and editing processes.

Another strategy used to improve student achievement is increased staff and parent involvement.



As a first step, Chuska provided extensive staff development for all dormitory, recreation, food service, and academic staff. As staff members increased their skills, they were encouraged to promote the school through presentations at national conferences and local organization and agency meetings. The local, elected school board has taken an active role in the improvement of programs. Board members visit classrooms, the kitchen, and the dormitories to talk with students and staff about the program. As the program has evolved, more time has been spent on involving parents. Strong parental support has been demonstrated by their commitment to provide transportation for their children to attend this particular school rather than the public school which does have transportation.



promote the school through presentations at national conferences and local organization and agency meetings. The local, elected school board has taken an active role in the improvement of programs. Board members visit classrooms, the kitchen, and the dormitories to talk with students and staff about the program. As the program has evolved, more time has been spent on involving parents. Strong parental support has been demonstrated by their commitment to provide transportation for their children to attend this particular school rather than the public school which does have transportation.



Indicators of Change

- Many of the students now score at or above national norms.
- Students have had their stories published in *Stone Soup* magazine.
- Student attendance has greatly improved.
- Chuska designated as a 1989-91 Center of Excellence by NCTE for their Whole Language/Whole Child program.
- Chuska chosen as Exemplary Ch. 1 Whole Language Program by U.S. Dept. of Education.

McCormick Elementary

701 McCormick School Road
Farmington, New Mexico 87401
Joyce Roberts, Principal

In 1984 Ms. Roberts was appointed principal of McCormick Elementary School, which has a total enrollment of 480 students, kindergarten through sixth grade, is 55% Hispanic, 27% Native American, 17% White and other, and 1% Black. Seventy-five percent of the students qualify for free or reduced



lunches. Historically, the school had a reputation as a "tough" school with undesirable students. Ms. Roberts wished to improve the reputation of the school as well as the achievement of the students. She implemented two strategies that have changed the reputation and the atmosphere at McCormick.

First was the adoption of the whole language approach, and second was the introduction of school/business partnerships. The whole language program employs the seven components previously described in the Chuska School report. Since the whole language approach is different from traditional teaching methods, extensive staff development is planned by the principal in conjunction with a committee that administers the school-based budget. Since every teacher receives needed support, including the experience of visiting similar programs, the school has a very low turnover rate among teachers.



A second strategy is the implementation of business/school partnerships and a parental involvement program. The business/school partnerships were the direct result of extensive work on the part of Ms. Roberts. She mailed letters to community members introducing the school and inviting them to visit for tours. She stressed to potential partners



that no material or monetary donations were necessary, but instead whatever they could provide in the way of time, personnel, and input was welcomed. This effort has positively increased the school's identity within the community. The partnerships provide role models and leadership examples for students through such activities as individual counseling, visiting speakers/teachers, sponsorship of individual students in sports activities, providing attendance and achievement incentives, and donations of equipment.

The school offers classes in the evening for parents in English and GED preparation. In return parents volunteer in the classes. Some of the other partnerships include: a "Top Gun" Club for grades 4, 5 and 6 with a Navy recruiter, who provides a t-shirt to students who have a 3.5 GPA; securing volunteer services from



various community professionals to work with the students; recruiting volunteers to paint the gym; and changing an available classroom into a kitchen with donations from the community to equip and supply the kitchen.

The changes, donations, and successes due to partnerships and parental involvement reflect a great deal of work, time, and dedication on the part of the school staff. There is constant communication with the parents, who now are actively involved in Native American Week, Fiesta, and a book-making project at the school.

Indicators of Change

- Reduction of discipline problems.
- Teachers and aides are bringing their own children to attend McCormick.
- 98 to 99% attendance at parent conferences.

Communications Program

Okemah Senior High School
Second and Date Streets
Okemah, Oklahoma 74859
Mac Smith, Principal

Okemah is a small rural school in central Oklahoma. In 1988 the school district implemented a policy that students who score low in English courses or on standardized tests in reading comprehension, language expression, reading vocabulary, language mechanics, and spelling will be enrolled in a special course, either Communications I, II, III or IV, to enhance their English and/or reading ability. The admission criteria are based on teacher recommendation and/or results on placement tests.



The goal of the program is to enhance reading ability for all students, regardless of their grade placement or range of ability. The scope and sequence of skills covered in the communications classes include lifetime reading skills, comprehension, listening, study, and basic literacy skills.

This program is locally funded and developed to encourage students to become active readers. The principal brought in a reading consultant, Diane Canavan, to work with the English teachers who would teach the special courses of the Communications Program. The principal has supported the program by providing a common planning or preparation period for the four teachers, staff development, and freedom for teachers to choose which section they wished to teach. The four teachers expressed enthusiasm and dedication because they have been part of the project from its inception and involved in every stage of planning and development.



The emphasis of each of the four sections of the course is different but cumulative. A description of each is as follows:

- Course I, which is for freshmen only, attempts to get students hooked on reading by using games and other activities that enhance comprehension and thinking.
- Course II, which is for students who have an instructional reading level (IRL) of grades 5-7, focuses on survival reading with a concentration on real activities. There is a heavy use of the newspaper and other real-life reading experiences.
- Course III, which is for students with an IRL of grades 7-9, emphasizes content area reading. The students work on critical reading and increasing their vocabulary for achievement.
- Course IV, which is for students with an IRL of grade 9 or above, works on developing critical thinking skills, test-taking skills, listening skills, and recreational reading skills. The materials for this course include newspapers and novels.

Indicators of Change

- Increased student interest in reading.

- Student requests for the class.
- Staff involvement in development of new programs.

Los Encinos Special Emphasis School

1826 Frio

Corpus Christi, Texas 78417

Mrs. Yolanda F. Gonzalez

Los Encinos is one of seven Special Emphasis Schools in Corpus Christi established to focus on the fundamentals of reading with a special emphasis on phonics. This program was introduced four years ago with extra funds from the local school district to provide better curriculum/instructional experiences. Los Encinos is 86% Hispanic and 60% low income.

At Los Encinos Special Emphasis School, the students are growing, learning and succeeding because of several factors. First, the staff has a positive attitude; they plan cooperatively and share ideas—a process that strengthens the school's excellent, well-paced curriculum and leads to academic growth. Second, the students are involved in extracurricular activities, experiences that increase their feelings of self-worth and success. Third, parental involvement in both academic and extracurricular activities makes the school significant to the family unit as a learning environment.

The school's two main goals, academic excellence and character development, are stressed in all activities. The teaching of reading, math, and higher-level thinking skills provides avenues for developing decision-making skills, building respect for people and property, and discovering each individual's identity. This sensitivity to an individual's worth is demonstrated as students hold class discussions and exchange ideas democratically. The cooperative spirit is visible throughout the school in well-cared-for classrooms, grounds, and buildings. Character development and self-esteem are the foundation on which academic excellence builds. Los Encinos



Special Emphasis School's high standardized test scores attest to the attainment of the school's two main goals.

One of the most significant things about Los Encinos is its positive environment for students, staff, and parents. Teachers strive to maintain enthusiastic and willing students by constantly providing quality education in a safe and positive atmosphere. Many special school activities for students and teachers contribute to this environment. There are special activities for students like birthday recognitions; Friday popcorn for classrooms with perfect attendance; ribbons for students who make the the A or A-B Honor Roll during a six-weeks reporting period; special test stamps and treats for a grade of 90 or better on an exam; balloon release ceremonies for special school-wide recognition or awards; classroom guidance sessions to enhance students' self-worth and responsibility; special congratulations during morning announcements for students who receive school or community awards; and printed positive messages called "Blue Cards" for students to share with other students who are in need of an extra boost to succeed.

There are also special activities for teachers and staff, including birthday recognitions; luncheons held on- and off-campus to celebrate various occasions; and Teacher-of-the-Week drawings for a special parking place. Special provisions for parents' needs include: meetings on topics selected by parents; a "parents' room" for volunteers to relax, plan, and carry out activities; and certificates of recognition or gifts presented to parents who have made significant contributions.

Indicators of Change

- Increased enrollment from 400 to 750, due to people moving into the area and choosing this school.
- Decrease in crime from approximately two break-ins a week to two in four years.

- Selected as a nationally recognized elementary school for two years by U.S. Department of Education.
- Enthusiasm and attitude of students and teachers.
- High scores on standardized tests.

Summary

The six programs represented within this update, although remarkably different from one another, still bear some striking resemblances. All require the exercise of administrative leadership, rather than being personality-dependent. While strong personalities often emerge as leaders, the terms are not synonymous. These programs can be repli-

cated at other sites with similar needs/resources. Even if leadership is available, however, both staff and administration must be committed to the development of a new program for it to be successful. Thus, there is a need for on-going staff development in order to insure staff understanding and preparation for the task at hand. All the programs take a broad definition of student achievement, looking both at standardized testing and at other, school-defined, measures of achievement. They tend to focus on reading, writing, and thinking from a process-based view of education rather than a skill and drill approach. The need for parent-involvement is great, both as reinforcement for their children's participation in the program and for community commitment to the establishment and development of programs that will facilitate student achievement.

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Further information about these promising programs can be obtained by directly contacting the listed party or by contacting Theme E SEDL staff members, Dr. Ida Jean Holman, Dr. Magdalena Rood, or Dr. Dee Seligman (512-476-6861).

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Winter Issue

AHEAD OF THE CURVE

Number 3

AHEAD OF THE CURVE

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The Southwest Educational Development Laboratory recently hosted a meeting focused on technology in schools for a group of teacher trainers, school administrators, and staff development specialists. Held at the Dallas INFOMART, January 23-24, 1990, the meeting was sponsored by SEDL's "Facilitating Student Achievement in Reading, Writing, and Thinking with Partnerships and Technology" (Theme E) program; participants were educational partners for SEDL's five-state region. This meeting gave them the opportunity to learn about current software and technology through attending sessions in the showrooms of APPLE, Inc., XEROX Corp., AT&T, and Norvell, Inc. In addition, participants toured the INFOMART building to learn about other companies and services within the building. Each day ended with participants' discussing some of the issues underlying technology use in schools.

During these discussion sessions, the attending Theme E partners raised several issues of general interest, among which were questions about acquiring technology when money is scarce, preparing teachers to use technology, and upgrading older equipment. SEDL Theme E staff decided to extend the discussion in this issue of *Ahead of the Curve* by interviewing five participants regarding their experience with these issues.

SEDL Theme Staff chose the participants to represent five distinct perspectives about technology:

Joyce Clark, an Assistant Professor of Education in Louisiana who does a good deal of inservice teacher training;

Carroll Pettigrew, an Arkansas Reading Specialist for the Arkansas Education Cooperative system, who does all inservice teacher training but has very limited exposure to technology;

Kay Kincade, an Assistant Professor of Education in Oklahoma who works with preservice and inservice teacher training;

James Miller, Jr., a New Mexico school superintendent who is promoting the use of computers in the classrooms and offices of his Farmington district;

Cathy Smith, a Texas Technology Specialist who works for Region VII Education Service Center in advising school districts and teachers to plan for effective use of computers in their schools.

These five participants, who incidentally represent the five states of SEDL's region, were asked to respond to the following questions:

- How are you using technology?
- What problems are you experiencing?
- In what ways have you been successful?
- What are your future plans for using technology or what decisions must you now make?
- How useful was the INFOMART meeting to you?

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Using Technology for Inservice Teacher Training in Louisiana

Joyce Clark

Joyce Clark, Assistant Professor in Teacher Education, Grambling State University and Theme E partner, says her goal for teachers is to "get them to use the computer as a tool, just like any other tool that they would use and not make it something exotic that is not part of their regular program. I want teachers to create an environment where the computer is as natural a part of their environment as textbooks are." She attempts to achieve this goal in several different contexts: a summer graduate inservice course for teachers at Grambling State; an undergraduate advanced methods course; and direct assistance to classroom teachers during the school year.

Clark believes that teachers need a media-rich environment that can address the three basic learning styles—oral, auditory, and kinesthetic learning. Computers form part of this environment in the same way that listening stations, film strips, and video do. She encourages teachers to have students create products using various technological tools. For example, students might use a computer to write a script for a video production, or they might write title frames or question frames for those periods between the on-screen action. Thus, video becomes the center of the students' production and computers another tool.

Inservice with Technology

At least once a month, Clark goes to schools to work directly with teachers. For example, she worked with a sixth grade social studies class. Students were studying interpretation of different types of graphics. Clark helped the teacher integrate a multi-media experience into the regular curriculum by focusing on news cartoons. After studying the characteristics of news cartoons, students created their own news cartoons using the "Create with Garfield" software and wrote using a word-processing program a description of each cartoon. Both the cartoons and the descriptions went into a book for their classroom. Also, students videotaped the cartoons and added music and a script. Thus, students had the opportunity to use the same skills in a variety of media.

During her summer graduate course at Grambling State, which provides inservice credit for teachers in the Louisiana teacher exemption program, Clark simulates typical classroom needs that can be more efficiently and creatively addressed with the assistance of computers. She believes that many teachers simply don't know the power of a computer to do the mundane but time-consuming things that they ordinarily prepare by hand: award stickers, letters to parents with tear-off sheets, signs, student records, graphics for social studies exhibits, covers for books, lettering, etc. She believes if teachers and students regularly use computers for such purposes they will come to understand their power and usefulness.

People-Problems with Technology

Clark believes that teachers are often afraid of computers, or they have a misguided notion that computers are useful only for drill and practice or for playing games. Especially in Louisiana, where teachers have lifetime certificates and haven't been back to school for a long time, many teachers simply don't have much exposure to computers. Also, most schools have only one or two computers in the whole school, rather than multiple computers in each classroom. In fact, Clark says she has only one site with enough computers for a group of teachers to have hands-on instruction.

Teachers, under a lot of pressure to raise scores on standardized tests, also often have the misguided belief that writing and reading instruction via computers will not help raise student performance scores as much as traditional methods will. In contrast, Clark believes that computer technology not only enhances reading and writing but also allows teachers to present learning activities in much more developed and sophisticated formats. For example, a reading textbook might suggest the activity of making a summary of a story by making a story strip. By using a camera and a VCR, students could develop a story strip, show it on a monitor to classmates, and use the movie-type format in a real vehicle for making movies.

Success with Technology

Despite these problems, Clark feels her efforts are paying off. Many of the teachers exposed to Clark's instruction have continued to develop their

own ideas using technology. As President of the North Louisiana Reading Council, Clark organized a summer conference on technology and reading for 55 principals and reading supervisors, whom she showed how to use cameras, pre-packaged educational t.v., and voice synthesis in their reading programs. Many of these administrators have called back for further information. Clark also plans to provide workshops in technology for Louisiana Chapter 1 and for Headstart teachers this summer. She continues to spread the word on technology's usefulness; for example, she videotapes excellent instructional strategies, like Readers Theater. Some classroom teachers then allow students to view themselves participating in Readers Theater on tape as a reward for good behavior. Thus, videotaping can serve both as an instructional strategy and as a classroom management tool.

Future Plans for Technology

Clark plans to continue her work with principals and supervisors to demonstrate new applications of technology in the classroom. By sending her student teachers into their schools with lots of training in technology, Clark can affect these administrators indirectly as well.

One problem the university needs to address is that Grambling State currently has computers with 512k and 640k of memory, while area schools often only have 64k and 128k computers, limiting the kinds of software that can be used. Thus, there is a large gap between what the schools have and what the students and teachers at the state university are trained on. Clark says, "Where do I start? I don't want to start building on the sixth floor." There is a real problem of taking teachers from knowing nothing to updating them on what is available, since they don't have access within their classrooms to the more sophisticated equipment that will run updated software. The state university needs to set priorities for using their resources in a manner consistent with real-world problems that their students will face.

Usefulness of INFOMART Meeting

Theme E's INFOMART meeting was exciting, Clark feels, because it provided information about distance learning via interactive video on a nar-

row-band phone-line transmission. Clark believes that the information will be valuable as Louisiana expands its use of technology. She believes that in Louisiana, "We are starting; we are learning; we are trying. In the long run I think teachers will see the advantages of this really rich media environment."

Using Technology to Improve Reading Instruction *Carroll Pettigrew*

Current Use of Technology

Carroll Pettigrew has been a Reading Specialist for the Arkansas Education Cooperative system since 1988. Before he came to his current position, he served as a Chapter I teacher and tried to implement technology in his classroom. He ordered a set of software in reading that "did everything, especially motivate students." The software came in at the end of the year, just about the time Pettigrew left and his aide filled the position. The aide did not know how to use the software, and there was no staff development available to assist her. As a result, the software was never used, and, over the years, has reportedly been misplaced in the general shuffle.

Pettigrew uses this story as an illustration of the problems Arkansas, as well as other states, faces in implementing the use of technology, as teachers and trainers are generally not prepared to use the equipment even when it is provided for them.

Pettigrew's job as a Coop Reading Specialist is to work with teachers to improve basic skills instruction in reading and to raise test scores. Since his job description does not specifically call for improving the general reading "environment," which includes technology-based instruction, but instead focuses on basic skills, he can only suggest the use of technological approaches when specifically requested to do so by a school administrator. Thus, as Pettigrew acknowledges, he has been "sheltered" in his familiarity with what is currently available.

Nevertheless, Pettigrew is receptive to good ideas that assist his teachers with reading instruction, and he visited INFOMART with an open mind. He was "overwhelmed," both with what is avail-

able and with the costs, but he was intrigued. For example, Pettigrew believes the Knowledge Navigator system, a portable voice-synthesized interactive computer that Apple Computers is developing, could prove particularly useful to teach reading to adults on an individualized basis. He thinks schools often miss the opportune time in children's lives to teach reading, and that society needs to remedy this situation among adults. We need to strengthen both the pre-school reading experience and adult literacy programs, he suggests. He was similarly intrigued with the possibilities for AT&T's distance learning telecommunications as a valuable tool for rural regions, such as the De Queen area, near the southwestern border with Oklahoma, where he works.

Problems with Technology

From Pettigrew's perspective, there is a widening gap between the state of Arkansas' adopted approach to reading and the current philosophies behind some of the best computer software for reading. Most Arkansas schools are still using basal reading texts and focusing on basic reading skills concepts. Philosophies like whole language, which Pettigrew supports, are not widely practiced, although they are fostered to a degree through the Coops' training programs. Occasionally, a principal will ask for help implementing a computer-based reading program. However, on the whole, the requests concerning reading training do not demand knowledge or availability of current computer technology. The result, according to Pettigrew, is a widening gap between the focus of the software and the knowledge of teachers to use this type of reading software.

Funding for training teachers to use computers and appropriate software is the other problem, as Pettigrew sees it. Although several current Arkansas projects assist school districts in purchasing computers at reduced costs, many provide little or no staff development other than an initial orientation. Follow-up, a vital part of training, is often missing. The result, it seems, is that some teachers, who are not prepared to use the computers and software, do not integrate them into their curriculum and their instructional strategies.

Success with Technology

When Pettigrew has had the opportunity to research computer programs that will motivate students to read and encourage them to think, he has seen some remarkable improvement. He cited as one example his supplying some teachers with "Electronic Bookshelf" software. A teacher who used the software testified that it turned one boy, who never read, into a voracious reader. The usefulness of the technology apparently was the motivational element that was built into the program. Pettigrew recognizes that well-chosen software can serve this function.

Future Plans for Technology

Pettigrew feels that distance learning technologies, like those AT&T demonstrated at INFOMART, would be helpful for educators in rural areas, especially for activities such as teleconferencing to save administrative time and travel expense.

The next step for specialists like Pettigrew is to ferret out good software that teaches higher-level thinking skills; and to write grant proposals for equipment, software, and the necessary training for sheltered teachers who have no background in technology. In Arkansas it will be an important task for these specialists to work through their Coop directors to increase specialists' ability to respond to school requests for information about technology.

Using Technology for Preservice Teacher Education in Oklahoma *Kay Kincade*

"Be cautious," advises Kay Kincade, Assistant Professor of Education, University of Oklahoma and Theme E partner, and "don't try to force people to accept computers. Instead, model for them what can be done with a computer, and if they are already teaching, do it within their own classroom and within their content area." The sharing mode, not the directive mode, wins students and teachers over to technology. Such a strategy is very important because many people, according to Kincade, are skeptical about the potential of computers beyond that of a visually presented textbook.

Preservice with Technology

Kincade's advice derives from her experience in working in teacher education with both elementary undergraduates and reading graduate students in Oklahoma over the last five years. Computer anxiety is a big problem, according to Kincade. To address this problem, Kincade and other education department faculty members are integrating technology into their undergraduate content area courses. The new methods courses in elementary education content areas will be a part of the University of Oklahoma's new five-year teacher education program. The whole program should be in place by the fall of 1991.

Already in place is the incorporation of computer technology into the master's level reading courses that Kincade offers. Software that fosters higher-level thinking skills, active participation, and the integration of the reading-writing process across the curriculum, as well as programs that facilitate diagnostic/prescriptive teaching, are introduced and modeled for teachers working towards their reading specialists' certification and master's degrees.

Problems with Technology

In addition to computer anxiety, Kincade notes that other practical problems impinge on integrating technology in the classroom. These problems include: access to software, which is often expensive and not provided free for review in order to differentiate "skills and drills" programs from those that address higher-order thinking; and time for teachers to conduct software evaluation. This lack of funding for both software and equipment purchase is a big stumbling block in education.

Success with Technology

Kincade can see that many of her students are beginning to change their concept of the computer as an "electronic textbook" to the computer as another "learning tool." (This change in perception corresponds to what Joyce Clark notes in Louisiana.) To further this perception, Kincade has been busy demonstrating software in her classroom and helping students put together materials for lesson planning. Integrating software into thematic units to foster higher levels of think-

ing and the reading-writing process is a current project for Kincade. While obtaining quality software is a time-consuming process, Kincade feels she has made progress towards this goal.

One activity that Kincade feels is especially important is training teaching assistants and instructors to use technology in their undergraduate courses. By so doing, Kincade's efforts have a ripple effect both on graduate and undergraduate students.

Future Plans for Technology

To further explore the staff development and research possibilities of integrating technology into the curriculum as an educational "tool" for teachers and a motivational "tool" for students, Kincade now wants to establish a cooperative research and technology center for public schools at the University of Oklahoma. With such a center in place, faculty could train students on-campus as well as go on-site to actual classrooms. Faculty could assist teachers to use software appropriately and could do research on the effectiveness of varied learning environments and materials for different learning styles. A technology center would provide both on-campus facilities for workshops and teacher training and traveling computers that could be set up at the school sites. Presently, there is a dearth of equipment within schools on which to model use of the software. Although some schools have computer labs, most do not have computers in the classroom, and even fewer have interactive video capabilities, according to Kincade.

To pursue this new cooperative venture, Kincade and Dr. Jim Gardner, a colleague in special education interested in technology, are contacting schools and other faculty members to form a multidisciplinary team. With other team members, Kincade and Gardner will be writing a grant proposal during the summer to fund the research and technology center.

Usefulness of INFOMART Meeting

Kincade feels the INFOMART meeting was useful, not only to be able to see demonstrations of things about which she had only read but also as a networking meeting for those in teacher education

and technology. She is interested in working on a multi-state technology project with other Theme E partners and encourages them to contact her:

Professor Kay Kincade
University of Oklahoma
College of Education
ILAC Department
820 Van Vleet Oval
Norman, OK 73019

Managing a School District for Technology *James Miller, Jr.*

"Staying on the cutting edge of technology is the most difficult hurdle that faces schools today," says James Miller, Jr., Superintendent of the Farmington New Mexico School District. In a recent interview Dr. Miller described what has been happening in Farmington, the problems, the successes, and future plans.

Current Use of Technology

The Farmington School District has a vigorous program to improve technology across the district by working to increase the technology resources available to the students, expand their uses, and expedite administrative duties. Farmington is increasing the number of computers across the district; right now there is at least one computer in each classroom and at least one computer lab in each school. At the secondary level, students are being introduced to desktop publishing. Library services will soon include telecommunication capabilities that will allow students to sit at a computer in their school library and access several data bases.

To expand computer capabilities, they are exploring the compact disc and laser disc technology. By adding these capabilities, Farmington can provide the students with access to interactive video technology, which has extensive opportunities in education.

Distance learning is another avenue Farmington is using, with two TI-IN satellite sites available and plans to continue expanding this technology. TI-IN is used at an elementary school for instruction and at a special education facility for staff and

parent training. Technology also augments learning for students with disabilities by use of such devices as speech synthesizers, power pads, and communication boards.

In the administrative arena all schools are linked via AT&T desk top computers and UNIX, using software specifically written for Farmington's administrative needs. This system handles administrative tasks such as tracking attendance, free and reduced lunches, immunization records, counseling, and staff absences. It has significantly reduced the amount of paperwork. The computer can easily and quickly generate many state-required reports.

Problems with Technology

Dr. Miller outlined four areas of concern: staying current, acceptance of technology, training, and funding. He feels it is very difficult for any school district to keep up with the technological changes. The second area of concern is acceptance of the technology by the staff. This problem is linked to the difficulty of providing sufficient training in technology to keep teachers interested. Miller says "If there were enough money and time to provide the training, there would be a greater acceptance of the technology." The fourth is generally the first one mentioned by most educators, funding.

Success with Technology

Dr. Miller relates two success stories, one with students and one with administrators. At an elementary school that has a predominantly low-income, highly mobile population, a Precision Learning Computer lab has been established. Students who have used the lab have made rapid educational gains. The second story concerns the administrative linkage of all the schools through the AT&T computers and UNIX. The software has been successfully field-tested in the Farmington School District, and Dr. Miller feels that it would be easy to customize it for other districts who might wish to purchase it from Farmington.

Future Plans for Technology

Dr. Miller's plans for the future of technology in Farmington are directly related to the problems he

has encountered. Miller will be working with IBM to develop a long-range plan for the district this summer. This plan will direct the purchase and use of technology in the district and provide guidance for future decisions.

The problem of funding has been addressed by hiring a grant writer who will seek funds to implement the long-range plan and bring the school district to the cutting edge of technology. The other problems of acceptance of the technology and training should be alleviated through the development of a technology training center for staff members.

Coping with Rapidly Changing Technology *Cathy Smith*

Background

Cathy Smith left the classroom, where she had been a middle school math teacher, to join Region VII Education Service Center staff three and a half years ago to share her expertise in mathematics and technology. More than 60% of her time is dedicated to technology, primarily assisting teachers and administrators in the selection and use of technology. When Smith meets with school personnel to discuss their options, she simplifies the decision-making process by providing information, suggestions, and ideas for researching specific equipment and software prior to purchase. She does not provide a formula, but rather a process that involves techniques to evaluate programs and equipment; information about changes and upgrades; and information about technological options. This process helps district personnel effectively choose the best system for their needs and their price range.

Rapidly changing technology places a burden on schools to stay current. Smith emphasizes the importance of completing registration cards with all computer systems, for manufacturers generally offer discount upgrades to their registered users. If additional upgrades are needed, many companies manufacture upgrade cards and chips. When using third party upgrades, Smith advises it is best to keep with one company whenever possible. Smith herself has an original Apple II, not even an Apple

II Plus, that has been expanded to 256K of memory with an adapted shift key that will run Apple Works faster than an Apple II E. She strongly recommends that school districts plan ahead by checking the history of whatever they are thinking of purchasing: find out if the new versions support the old versions; look at the software and the equipment; and talk with people who are currently using it.

Problems with Technology

The greatest stumbling block Smith encounters both in training and facilitating the decision-making process is the person who comes to the session with set ideas about a particular product. "This person is often quite vocal and refuses to entertain the notion that something else might be appropriate," Smith says. "The process is complicated and retarded by these individuals."

Success with Technology

Smith relates a conversion story as an example of success with technology. At an "Introduction to Computers" inservice primarily made up of resisters, people who had put off the training to the bitter end, a particular person stood out by stating as he entered, "I have never touched a computer and never plan to." After six hours of training, he had printed out three different items to take back to his school with him. When he returned to his school, he requested a computer. Smith says, "One of my most important jobs is to take the people who do not like technology; do not want to use it; and see no need for it, and show them how to use it; that there is need for it; and get them comfortable using it."

Future of Technology

In the future, technology cannot be something that is separate; it must be more inclusive, part of the content areas, according to Smith, who became very animated as she described future technological possibilities. "In my ideal school there would be a lab for every four or five teachers and one or two stations in each classroom with a projection device for the teacher to actually use while teaching. The technology needs to be in the classroom, for it can make teaching more creative and mean-

ingful to the students." She indicated specific examples that are available now, such as the use of a computer with a laser disc in science which allows the class to view and understand the life cycle of different organisms in ten minutes.

Laser disc technology started about ten years ago, but its use in school with computers is still in its infancy. This technology allows the teacher or student access to motion or still pictures with a minimal amount of programming. With a program on a computer or with a hand-held device, a teacher or student can go to any track on the disc. The inexpensive hand-held control device is a little black box with a key pad and other controls similar to a remote control for a television. However, because the hand-held device cannot be programmed in advance, and each command has to be entered as it is needed, it is a little more difficult to use than a pre-programmed computer.

The selection of materials for this technology is rapidly growing. Currently there are complete interactive curricula available for math and other subjects that include outer-space footage sent back from the Voyager and footage of political events

and other television news coverage. Laser discs are perfect for schools, Smith explains, for they are virtually indestructible, and their educational potential is unlimited.

*** * * Upcoming Events * * ***
Classroom Assessment
Three-Day Staff Development Training:
What Teachers Need to Know to Assess
Student Performance

May 9-11, 1990

or

July 11-13, 1990

Presenter: Dr. Richard Stiggins

As a result of the training, participants will be able to conduct the following four workshops for preservice and inservice teacher training:

- 1. The Meaning and Importance of Quality Assessment in the Classroom**
- 2. Measuring Thinking Skills in the Classroom**
- 3. Using Observation and Judgment for Classroom Assessment**
- 4. Developing Sound Grading Practices**

*For additional information, contact
 Ida Jean Holman at (512) 476-6861*

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Fall Issue 1990

AHEAD

OF THE CURVE

Number 4

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This issue of *Ahead of the Curve* is the last in a series, as SEDL's project to help facilitate student achievement in reading, writing, and thinking with partnerships and technology (Theme E) comes to an end. Theme E was designed to provide a select group of partners, teacher educators, and staff developers with cutting edge research and practice-based information about instructional approaches that improve student achievement. The focus of this issue is on two staff development efforts designed to help teachers use these instructional approaches.

During the past two years Theme E partners in Arkansas, Louisiana, New Mexico, Oklahoma, and Texas received a variety of materials and participated in a series of state-specific meetings, two teleconferences, and one regional academy. These programs featured leading figures including Barbara Presseisen, Richard Mehrens, Robert Ennis, Roger Farr, Fran Claggett, Robert Swartz, Richard Paul, Margarita Rivas, and Sylvia Pena. This summer SEDL sponsored two regional workshops on classroom assessment featuring Richard Stiggins, Director of the Center for Classroom Assessment at the Northwest Regional Education Laboratory.

Through a "train the trainer" strategy, Theme E partners integrated the information provided them into their own staff development programs and

teacher education courses. The partners did this in a variety of ways, such as (1) using activities developed by SEDL staff as part of their own training programs; (2) disseminating the materials and publications to colleagues and students; (3) bringing colleagues to the SEDL sponsored meetings; and (4) creating new staff development programs on the basis of their Theme E experiences. For example, Oklahoma partner J. Lindsey Stafford designed a three-hour workshop on teaching and assessing critical thinking for teachers who otherwise would have little or no access to latest developments in the field. In recognition of his efforts, Theme E staff advanced a proposal enabling Stafford to present his workshop at the tenth annual conference on Critical Thinking and School Reform at Sonoma State University, August 5-8, 1990.

THINKING SKILLS *An Inservice Workshop*

Stafford designed the *Thinking Skills* workshop to help teachers realize that critical thinking is not just another subject matter for the curriculum but rather a teaching methodology. He challenges teachers to strive toward completing "the unfinished education agenda—the teaching of thinking," and urges them to consider that "As we approach the twenty-first century, there is no longer a need to make our youth endure the three R's: receive, recall, and regurgitate...." (*Thinking Skills* facilitator's handbook)

The first half of the workshop focuses on helping teachers identify opportunities to stimulate student thinking, and provides examples of ways in which critical thinking may be infused into the teaching of any subject matter. One way to get students to think, says Stafford, is to give them thought provokers. Stafford illustrates his point by writing a provocative question on the board to focus the learner's attention as the session begins, and by ending the session with another such question to whet the learner's appetite for the next session.

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This issue of *Ahead of the Curve* was written by
Lonne Parent and Magdalena Rood

The second half of the workshop focuses on the use of classroom observational assessment, rather than formal tests, to monitor student use of critical thinking. For example, Stafford points out that critical thinking may be spurred by simply asking students to agree or disagree with a statement made by another student or found in the text. Even the simple recall questions often found in the back of the book may be used to spur thinking by asking students to support or explain their answers, to agree or disagree with the book, and so forth.

Stafford has trained six other staff developers who will be using this workshop with classroom teachers around the state. On August 20, Stafford delivered the first training for the Noble Public Schools, and he has been invited to present the workshop at the Oklahoma Education Association's statewide conference on October 19.

Stafford has plans to develop a second workshop that builds on Richard Paul's approach to remodeling the curriculum, integrating it with the thinking-based lesson plan suggested in *Teaching Thinking in K-12 Classrooms: Ideas, Activities, and Resources* by Iris McClellan Tidet, Jo Ellen Carlson, Burt D. Howard, and Kathleen S. Oda Watanabe (1989, Needham Heights, Mass: Allyn & Bacon Publishers).

For more information about *Thinking Skills* and other workshops in the OEA Staff Development Training Series, contact:

Oklahoma Education Association
Instruction and Professional Development
323 East Madison
Oklahoma City, OK 73105
1-800-522-8091 or locally 528-7785

CLASSROOM ASSESSMENT: Four Staff Development Workshops

Most people assume that teachers are proficient in effective classroom assessment. However, after 10 years of surveying teacher preparation programs and classroom observations, Richard Stiggins, director of the Center for Classroom Assessment at the Northwest Regional Educational Laboratory, Portland, Oregon, concludes that in reality effective classroom assessment is rare. Few teacher education programs provide appropriate course work in classroom

assessment, instead offering statistically-oriented tests and measurements and psychometrics courses that fail to prepare teachers in the skills of observing and giving feedback.

Stiggins' goal is to train teachers to use his practical approaches for effective assessment of student achievement in the classroom. One of the objectives of these workshops is to help teachers reduce their fear of classroom assessment and help them feel comfortable in using assessment skills. SEDL arranged for Stiggins to conduct two three-day seminars for teachers and administrators in the southwestern region in May and July, 1990. At the conclusion of each seminar, participants were certified to conduct their own workshops in:

1. Understanding the meaning and importance of quality classroom assessment
2. Measuring thinking skills in the classroom
3. Classroom assessment based on observation and judgment, and
4. Developing sound grading practices

The following discussion is a summary of Stiggins' advice on improving classroom assessment. Because districts and schools differ, the pointers presented must be adapted to meet local needs. The ultimate goal of all staff development programs in classroom assessment is to obtain a comprehensive, yet precise, appraisal of each student's achievement over time.

Understanding the Meaning and Importance of Quality Classroom Assessment

For districts or schools just beginning a staff development program to improve teachers' assessment skills, Stiggins emphasizes the importance of establishing an understanding and agreement on the meaning of classroom assessment. He suggests that teachers and administrators brainstorm collectively and discuss existing teacher skill and knowledge of classroom assessment. Then, the staff development program can build from this starting point. Such discussions should address the following issues:

- Performance outcomes that can be assessed

- The importance of assessment to students
- Alternative assessment methods
- What can go wrong in assessments
- How to avoid the pitfalls
- How to evaluate the quality of assessment

Once established, this examination of existing assessment knowledge provides a foundation for subsequent staff development sessions.

Measuring Thinking Skills in the Classroom

Of increasing importance in all academic subjects is student thinking. Before thinking skills can be assessed, it is essential that thinking be defined, and assessed accordingly. Stiggins defines five types of thinking that teachers may assess in the classroom:

1. Recall: Remembering key facts, definitions, concepts, rules and principles
2. Analysis: Identifying the essential components of more complex tasks, specifically part/whole and cause/effect relationships
3. Comparison: Recognizing or explaining simple or complex similarities and differences of component processes/actions
4. Inference: Applying deductive and inductive reasoning
5. Evaluation: Judging quality, credibility, worth, or practicality

Stiggins suggests that teachers plan classroom assessments with the use of an assessment planning chart to help develop oral and test questions for each of the five types of thinking skills. He also suggests that teachers develop and practice interactive questioning techniques to address each type of thinking; for example, the use of open-ended questions requiring application of knowledge. He encourages teachers to work cooperatively to generate alternative ways to integrate different types of thinking into instruction and assessment.

Classroom Assessment and the Role of Observation and Judgment

An important source of classroom assessment is teacher observation and professional judgment. Teachers regularly observe student behavior during class and on homework assignments. With each observation they make judgments on the quality of this work. For example, teachers examine written assignments to determine whether the product communicates well; they evaluate student verbal responses for clarity; and so forth.

The use of observation and judgment in teaching is called performance assessment. While such observation and judgment is a natural part of teacher-student interactions, it is crucial that teachers and administrators understand the most effective uses of performance assessment and the ways in which it may affect student behavior. Stiggins recommends that in improving performance assessment, teachers and administrators should work to:

- Establish the credibility of performance assessment as a legitimate source of information on student achievement: Determine what content area and skills will be evaluated; ascertain what kind of assessment results will be needed (rank order, mastery); establish how to rate the performance, and create a record of the assessment (rating scale, portfolio, checklist, anecdotal record, audio or video tape).
- Build a framework within which to conceptualize, design and develop performance assessment: Consider how to evoke the performance and the method(s) used to observe it (structured exercise, naturally occurring events), plan how to assess the performance (diagnosis, grading, grouping, evaluating instruction) and how the proficiency will manifest itself (behavior to be observed [what behavior] or product [what product]).
- Practice applying that framework in the context of the classroom.

Performance assessment may not fit into the format or structure of all classes in exactly the same way.

The specific techniques used may differ from subject to subject, from teacher to teacher, as well as from school to school.

Developing Sound Grading Practices

Stiggins recommends that all school districts develop clear grading policies and procedures to guide teachers as they develop their own grading practices. Ultimately the purpose of grading is to communicate something useful about student performance. Several factors must be addressed in establishing grading guidelines:

- What are the purposes of grades, e.g., are they used to motivate or describe?
- Which student characteristics can or must be incorporated into report card grades, e.g., should achievement, ability, effort, motivation be considered?
- Which activities should be graded, e.g., will class participation, performance assessments, daily homework count?
- How will assessment information be gathered and processed, e.g., what records will be kept, how much information will be gathered, how will the grading scale be determined?

Stiggins further suggests that as school personnel develop grading guidelines they consider the relative advantages and disadvantages of the various grading practices and explore options to promote sound applications of all such practices.

Grading is complex and can be an emotional experience for both the teacher and student. There are many aspects to be taken into consideration and the district or school grading policies and guidelines must be clearly understood by teachers in order to be useful in devising their classroom assessment measures.

In conclusion, Stiggins' workshops raise important questions that need to be discussed openly among educators if they are to improve the way student performance is assessed. According to Stiggins, if students are to be given a fair chance, educators have to expand their knowledge and seek out new ways of

assessing them. They need to feel comfortable when dealing with assessment and in seeking out alternative assessment methods. Finally, Stiggins urges teachers to strive for impartiality in their assessments and to concentrate on becoming proficient in reflecting an accurate picture of what is being learned and taught.

A Classroom Assessment Trainer's Instructional Package can be obtained through the Northwest Regional Educational Laboratory, Document Reproduction Service, 101 S.W. Main Street, Suite 500, Portland, Oregon 97204. The cost of the package — a trainer's manual and five videotapes — is \$125.

TEACHING FOR TRANSFER and THE TENTH ANNUAL CRITICAL THINKING SKILLS CONFERENCE

*A review of two intensive
staff development conferences*

The Illinois Renewal Institute's (IRI) seminar on *Teaching for Transfer* was part of the 1990 National Training Institute's conference on cooperative learning, whole language, and critical and creative thinking, held at Lake Tahoe, California, July 11-15, 1990. Taught by Robin Fogarty, John Barell, and David Perkins, this seminar was based on the assumption that all teaching is for transfer, but that transfer does not occur automatically. In a tightly packed schedule of morning, afternoon, and evening sessions, seminar participants explored the use of instructional techniques like modeling, simulations, problem solving, meta-cognitive reflection, and questioning (1) to achieve the objectives of instruction in any subject area (e.g., knowledge, principles, skills, concepts, attitudes, and dispositions) and (2) to help students understand how these are related to other concepts within the content, across disciplines, or in life.

The tenth annual *Conference on Critical Thinking and Educational Reform* held at Sonoma State University August 5-8, 1990, offered a unique combination of philosophical concerns and instructional techniques. Explaining the conference theme, "Which is more important, content or thinking?" keynote speaker Richard Paul suggested that students can master content only through disciplined thinking and that thinking can be disciplined

only through content. Approximately 1,200 educators attended four to five one-and-one-half hour sessions each day of the conference to explore the links between content and thinking. In accordance with the broad philosophical and practical goals of the conference, the presentation sessions ranged from theoretical explorations of the concept of intelligence, among which were presentations by Arthur Costa, Matthew Lipman, and Frances Moore Lappé, to specific methods and techniques for infusing critical thinking into subject matter at all levels of schooling from kindergarten to college-level courses.

Both conferences followed intensive schedules and demanded much effort on the part of the participants. Presenters at both conferences had creative and exciting ideas for improving the teaching of thinking. Unfortunately, the combined effects of the tremendous scope of the goals and the relatively short timeframes of both conferences created learning situations not unlike that of the traditional school day. To meet the goals within the time allotted, presenters were often limited to talking about the instructional environments most conducive to student learning rather than creating such environments. Consequently, the presenters were unable to do justice to the very ideas they were trying to inculcate.

Is there a better approach to staff development? Perhaps staff development professionals could learn from educational programs that exemplify effective teaching—programs like the one developed by Deborah Meier at the Central Park East school in Harlem (McREL, 1990). Based on the idea that education from kindergarten to high school graduation is a highly personalized relationship between student and teacher, Meier's approach requires that each student claim ownership over his or her course of study. Students are actively engaged in the process of designing their learning experiences in accordance with their own interests. Teachers act as coaches, editors, critics and supporters, but not as deliverers of information. Both teachers and students are expected to enjoy themselves and their interaction with each other.

Similar ideas are evidenced in magnet schools and academies designed to promote advanced levels of achievement in specific disciplines; for example, the Illinois Mathematics and Science Academy (1989-90 *Profile*), the Kalamazoo Science Lab in Kalamazoo,

Michigan (Thompson, 1987), the Science Resource Laboratory in St. Louis Park, Minnesota (Bothreau, Lemanski, Samuelson, & Whitney, 1987; Kaplan, 1988), and the Science Academy in Austin, Texas. Another approach that works within the traditional school structure is typified by (1) school-based enterprise programs; for instance, *Foxfire Magazine* is written and published by students (Wigginton, 1987); and (2) special interest programs like the Model United Nations simulations at the school, state, national and international level (Carter, 1989, Friesen, Note 1).

In reviewing the *Foxfire* experience, Eliot Wigginton suggests that the common denominators of powerful, memorable learning experiences are activities that:

- are appropriate to the academic agenda;
- involve a generous element of student choice, teamwork, peer teaching, active problem solving, and collaboration;
- are based on good teaching practice and are academically sound;
- tend to be connected to a community beyond the school, or address an audience beyond the teacher.

In other words, the effective instructional activities provide students with a meaningful context for learning that requires them to do something interesting. In these programs, students are not, as Wigginton says, condemned to a life inside a textbook. A powerful learning experience addresses teachers' perpetual challenge to do something with the stuff of education, and to meet students' need to know what education is for.

Is it possible to construct staff development programs based on these characteristics? With the current emphasis on school improvement, staff development is becoming progressively more important. The professional skills of teaching are growing in number and complexity, while the time available for staff development has not increased. Effective programs will be needed to maximize teacher mastery of instructional skills. The characteristics of successful school programs may help to re-think current staff development seminar and conference formats for optimal teacher learning.

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Reference Note

Note 1. Information obtained during site visit with R. Friesen, Model United Nations teacher at Laguna Beach High School, Laguna Beach, California, and 1988-89 Faculty Advisor, International Model United Nations Association.

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